Summer 2004

Swoosh and Boom

QUARTERLY

Indian Head Division N S W C

Indian Head Division
Naval Surface Warfare Center

Captain Joseph N. Giaquinto
Comamnder
Indian Head Division, NSWC

Welcome to the first issue of "Swoosh and Boom Quarterly." The purpose of this publication is to share the mission success stories of the Indian Head Division, Naval Surface Warfare Center (IHDIV, NSWC). Inside you will find the stories and images that convey, not only results of our outstanding technical work for the Department of Defense, but a glimpse of the people whose strong organizational commitment are the reason for this success.

IHDIV is a leader in the Navy's energetic enterprise - it is our job to research and provide energetic systems for our fighting forces around the globe. Energetic systems contain explosive, propellant, and pyrotechnic material. Complimenting our energetic materials formulation work we research, develop, test and engineer the range of technologies necessary to deliver ordnance to the military. If the Department of Defense has a problem or threat that requires a scientific or technical solution, the IHDIV collaborates with other laboratories, academia, private sector partners, or government agencies to provide the right energetic system to do the job.

With over 1,200 employees, the IHDIV is a successful and vibrant technical institution, focused on applying science and technology to deliver the safest and most reliable weapons and weapons systems necessary to defeat any target. We come to work each day giving our very best so that our service men and women can do their jobs, defend our American freedoms, and come home safely to their families.

The success and achievements of IHDIV are attributable to a combination of state-of-the-art facilities, energetics consolidation at Indian Head, and sustained investment by the DoD in Science and Technology, and most importantly by our work family, a force of extremely talented, dedicated and innovative people.

We are extremely proud of our recent contributions in support of Operation Enduring Freedom and Operation Iraqi Freedom and have devoted this issue to introduce you to some our recent energetic systems mission success stories.

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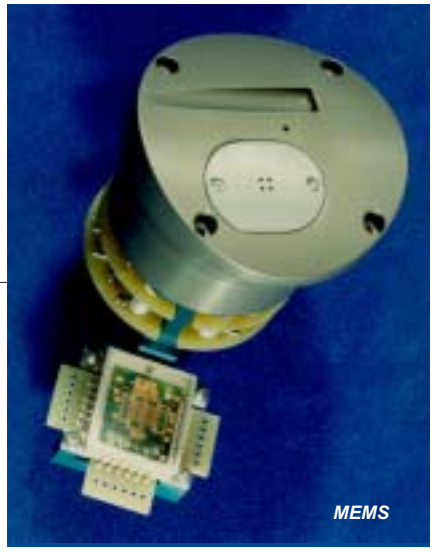
Captain Joseph Giaquinto
Commander, IHDIV/NSWC

Jerry LaCamera
Technical Operations Manager

Christina Adams
Director, Corporate Communications (Code 07)
301-744-6505, adamcs@ih.navy.mil

Peggy Garlenski
Layout and Design (Code 072PG)
301-744-4294, garlenskimj@ih.navy.mil



We ensure operational readiness of the United States and allied forces by providing technical capabilities necessary to rapidly move any "energetics" product from concept through production, to operational deployment. Our capabilities include: research, development, testing, and engineering; acquisition; manufacturing technology; manufacturing; industrial base, fleet, and operational support for warheads; explosives; propellants; pyrotechnics; energetic chemicals; rocket, missile, and gun propulsion systems; missile simulators, trainers, and test and diagnostic equipment; tri-service cartridge-actuated devices, propellant-actuated devices, and aircrew escape propulsion systems; and other ordnance products.

Our capabilities provide technical expertise for special weapons, explosive safety, and ordnance environmental support. These technical capabilities and this expertise support all Naval warfare areas as well as the Army, Air Force, and private sector.

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Indian Head Support to Operation Enduring Freedom - Thermobaric Weapons Delivered to the Warfighter

by Tara Landis
Corporate Communications Office

The importance and military value of the Indian Head Division was once again brought to the forefront when a new thermobaric bomb, the BLU-118/B filled with IHDIV-developed PBXIH-135 explosive, headed to Afghanistan in support of Operation Enduring Freedom. Being relied on in times of war is not new to IHDIV. During Desert Storm, IHDIV was able to start up production quickly and meet demands for over one million pounds of low-vulnerability ammunition (LOVA), a gun propellant used in Army M-1 tanks. Similarly, IHDIV's established reputation in energetics was called on in support of recent military conflicts.

Thermobaric Explosive Development at Indian Head

IHDIV's Program Manager for Explosives & Undersea Weapons, Anh Duong, had spent several years promoting IHDIV thermobarics within the Department of Defense. "The need for high-performing internal blast explosives to defeat hard and deeply buried structures became evident after Desert Storm," explained Duong. From these efforts a strong relationship with the Defense Threat Reduction Agency (DTRA) was developed. The relationship proved to be the catalyst for IHDIV's involvement in the effort.

Among new explosive formulations being developed and tested at Indian Head was PBXIH-135, a new plastic-bonded explosive that was getting much attention. Developed by IHDIV scientist Erwin Anderson in the mid-90s, this explosive was unique in that it was thermobaric (designed to take advantage of the oxygen from the target for propagation and completion of payload reaction) and it had passed all testing for a 1.6 Extremely Insensitive Detonating Substance, the most survivable type of explosive available for penetrating weapons.

PBXIH-135 had been accepted as the leading candidate in a three-year advanced concept technology demonstration (ACTD) of a thermobaric weapon for tunnel defeat, to start in the spring of 2002. Moreover, Duong had been named as manager of the entire payload effort

A laser-guided BLU-118/B thermobaric bomb accurately hits the target and detonates during testing in Nevada. Photo courtesy of DTRA.

(l-r) Craig Cornish, Karen Burrows, and Pam Carpenter were part of the team effort.

for the joint DTRA/Navy/Air Force ACTD.

But within weeks of the September 11 terrorist attacks, with fighting concentrating in the hills and caves of Afghanistan, the Pentagon decided thermobaric weapons were needed to support the conflict. It was IHDIV's thermobaric explosive and manufacturing capability that were chosen to support the effort.

With DTRA leading the effort and the Air Force Armament Command (Eglin) in charge of aircraft system integration and weapons safety approval, the experts at IHDIV provided the payload and booster design and testing, development and scaleup of PBXIH-135, and lining and loading of the new bombs.

Teaming for the Effort

Accomplishing this work within a 60-day timeframe took an incredible amount of teamwork between IHDIV departments. The Applied Technology, Energetics Evaluation, Weapons, Supply, Public Works, and Research & Technology Departments were integral partners for this effort.

Pam Carpenter, Integrated Product Team Leader for Reactive Materials, was the Execution Team Leader with overall project coordination. "What was unique about this," she said , "was that we were running jobs in parallel, at the same time, versus in series, which takes more time and is typical of a project like this."

Carpenter explained the roles of the various departments: Karen Burrows (Weapons Department) was in charge of the booster studies, Doug Elstrodt (Applied Technology) was leading the mixing and casting task, Joseph Chang (Research & Technology) was the technical lead with extensive experience in producing PBXIH-135 and instrumental to the scaleup of the composition, and Richard Hardy (Applied Technology Department, Yorktown Detachment) was in charge of lining the warheads and also was key consultant for the development of bomb-loading procedure. These key individuals were supported by over 75 IHDIV personnel and contractors to get the job done.

IHDIV technicians casting bomb body with PBXIH-135. Photo by Bill Spencer, IHDIV.

Acquiring the necessary ingredients to make the explosive was the first job tackled explained Burrows, IHDIV's IMAD-HE Technical Coordinator. Production needed to increase to approximately 1,400 pounds versus the 50-pound mixes previously used for qualifying the material. With the help of procurement specialists Sandy Gragan (CAD/PAD Department) and Ruth Adams (Supply) all the necessary ingredients were obtained and received at the IHDIV within weeks.

Once procurement was finalized, Burrow's efforts concentrated on the warhead booster. As part of the weaponization (to a BLU-118/B bomb), modification of the Air Force fuze to include a Navy booster explosive and a different Air Force detonator with a longer time delay was needed. Burrows credits retired IHDIV employee and current co-worker Lou Montesi for his expertise on the project. "If there is anyone who knows bomb boostering and fuzing, it's Lou....we couldn't have done it without him," said Burrows. Burrow's group worked out of Fort A.P. Hill in Virginia for testing.

As part of the weaponization, modification of the Air Force fuze to include a Navy booster explosive and different Air Force detonator with a longer time delay was needed. IHDIV experts are shown here during conductivity check prior to test firing during the booster test phase of the effort.

After performing over 20 field tests, the group recommended a higher output Navy booster explosive, PBXN-5, to replace the current Air Force tetryl in order to guarantee reliable warhead detonation.

One hundred miles south in Yorktown, Virginia, Rich Hardy, supported by Mike Kenyon, Tommy Mason, John Foster, and Randy Riffe, was busy managing the assignment of lining the warheads. Their extensive knowledge on bomb loading (this group developed the PBXN-109 explosive loading procedures for the BLU-109 bomb) and tooling allowed for an expeditious turn-around time. Because of the change in explosive fill, compatibility tests and load designs were also provided. Two bombs in storage from a previous project were painted, lined, and shipped to Indian Head. After acquiring the additional units at Yorktown, the remaining eleven bombs were lined and delivered to the IHDIV within weeks. "I feel fortunate that I was able to support the operation," Hardy said. "There are few opportunities where one can contribute to something so important. Everybody involved worked very hard to support the effort."

Back at Indian Head, Doug Elstrodt, Team Leader for Product Development Cast Products and Technology Division, Applied Technology Department, was in full swing. Charged as project manager for explosive manufacturing and product loading of the BLU-118/B, Elstrodt credits the coordinated efforts of Linn Newman, John Macri, Angelo Brown, and Sandy Gragan for getting the job done. "We rapidly scaled up a manufacturing process that was, up to that point, one developed for a research explosive. From 50 to 1,400 pounds," Elstrodt explained. "I knew it was theoretically possible….It took a lot of approvals and people to make it happen so quickly." Elstrodt recognized additional coworkers who were instrumental to the effort running smoothly: the team from the Air Force of Alanson Fitchett and Sam Mitchell, who performed mass and physical properties testing on the BLU-118/B units to verify performance; Kevin Berry and Henry Boland who installed equipment; William Hare who stepped in without hesitation constructing slings where necessary and certifying building hoists for explosive material; and Mary Boyd (Applied Technology), who certified that all procedures for shipping were followed. According to Elstrodt, it takes approximately three weeks from raw material to delivery of the end product. After mixing the raw ingredients, the initial HMX coating mixture spends one week drying in an oven, after which the material is mixed and poured into the bomb forms and cures in an oven another week. When the product is cured, it is then x-rayed, measured for mass and physical properties, stenciled, and finally palletized, at which time it is ready for shipment.

Completed BLU-118/B bombs are transported to be cured, palletized and made ready for shipping. Photo by Bill Spencer, IHDIV.

The coordinated effort paid off when, within thirty days, the first two BLU-118/B bombs were delivered to a test site in Nevada for performance assessment. These units were successfully static tested and a third test was an end-to-end live drop exercise using an Air Force F-15E fighter jet. Test results showed that the BLU-118/B properly functioned as designed and provided superior performance against the target. Duong and Carpenter were present for the Nevada testing. "It was an incredible feeling to see all of our hard work came together fruitfully," Duong said, adding "It was exciting to see the weapon in action, to see that *it worked*!"

With the new thermobaric weapon passing performance tests with flying colors, the remaining BLU-118/B bombs were shipped and were ready for use by the Air Force. "From the date of getting the go-ahead to delivery of the final product was 67 days," Carpenter said with pride. News coverage showing footage from the tests in Nevada was aired on CNN and other national news stations. Excitement was high for IHDIV leadership and those involved with the effort. "It feels great to have something you have personally worked on be recognized and be used for such an immediate purpose," Carpenter said.

In describing Indian Head's accomplishment, Duong offers the analogy of the tortoise and the hare, explaining that other organizations have been well funded over past decades to work on various designs of thermobarics and hence were deemed well ahead of IHDIV in having technologies ready for weaponization. Despite the lack of funding, it was IHDIV's steadfastness and weapon-oriented formulation approach that "when it was time to step up to the plate, it was Indian Head who was there ready to perform," she said.

The Future

With this recent successful effort, IHDIV has been busy with requests for thermobaric product support. Currently, there are several programs proposed and/or funded, including work for the Marine Corps, Air Force, and DTRA.

Reflecting on the recent years in the defense business, Duong commented that with decreased defense budgets and talk of base closures, seeing your hard work make a product successful and having that success be recognized is a great encouragement. She conveyed what was a resounding theme from many, "It feels great to contribute to the nation's defense. After the tragedies of September 11, you saw the crowds waiving the American flags...the American people vowing to do something to fight terrorism....It was an opportunity to do something to defend our freedom."

IHDIV continues to stand out in the field of energetics. Delivery of this new thermobaric weapon is but one more example of IHDIV's capability to develop new energetics and transition them directly to the warfighter in support of this nation's defense.

If you would like more information on the subject, contact Mrs. Anh Duong, Program Manager for Explosives & Undersea Weapons, 301-744-6703.

SMAW-NE - A Teaming Success Story

by Kevin Gessner
Weapons Engineering

In response to an urgent U.S. Marine Corps need for a shoulder-launched enhanced-blast warhead, IHDIV teamed with the Marine Corps Systems Command (MCSC), the Naval Surface Warfare Center, Dahlgren (NSWC/DD), and Talley Defense systems (TDS).

The highly successful collaboration spanned only nine months from concept development to weapon system fielding and has become a model for other rapid-response projects to follow. The Shoulder Mounted Assault Weapon-Novel Explosive (SMAW-NE) team has recently been honored with the Rodger M. Smith Team award and the Marine Corps Systems Command Commanding General's Team Excellence award for their work on this project.

Recognizing a need to facilitate communication between personnel from other government organizations and from private industry, IHDIV established a working model that facilitated the open exchange of information. Provisions were established to co-locate NSWC/DD and MCSC personnel at IHDIV. An integrated product team (IPT) structure was established with open lines of communication. The SMAW-NE executive IPT worked to clarify roles, responsibilities, and project objectives. With this solid project framework in place, expertise in warhead design, fuze design, testing, manufacturing, systems safety, and systems integration from the four activities was applied to solving the technical challenges of this project. The skill and dedication of all team members is clearly evident in the group's collective accomplishments.

The effort was divided into two phases. Phase I major accomplishments included development of a warhead case design capable of penetration through brick targets, explosive selection, structural analysis, target analysis, fuze modification, performance testing, detonation train reliability testing, integration of the enhanced-blast warhead, production, systems safety

IHDIV developed SMAW-NE effectively penetrates two-story brick building during testing. Photo courtesy of IHDIV.

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An USMC assault man gunner carries a SMAW-NE to deter possible Iraqi paramilitary in a compound near central Iraq. Official USMC photo by Sgt. L.A. Salinas.

planning, and the successful completion of live round design verification testing. Although the amount of tasks completed is impressive, it is even more impressive considering that these highly dependent tasks were completed on-schedule within a four-month time period. During Phase II, a significant quantity of systems was produced and assembled for a comprehensive safety test series to allow for transportation and storage of SMAW-NE on U.S. Navy ships. Limited users tests (LUT) were satisfactorily conducted with successful demonstration of warhead reliability. The LUT test series culminated with live-fire demonstration of the capabilities of the SMAW-NE when used to defeat a brick-clad, two-story building. This test, witnessed by senior Marine Corps officers, demonstrated the impressive lethality of the SMAW-NE warhead. The bulk of the SMAW-NE rounds were then shipped to Iraq for their intended use.

Several factors contributed to the success of the SMAW-NE project. One major factor was the availability of technology. The enhanced-blast explosive fill developed with funding provided by the Insensitive Munitions Advanced Development office was qualified and recently proven in the BLU-118 thermobaric bomb effort. Without this investment in technology it would have been impossible to develop SMAW-NE in the given timeframe. The high level of cooperation between organizations, both internal and external to IHDIV, was another important feature. NSWC/DD provided critical expertise in systems integration. TDS had an existing production line that was made available. IHDIV provided critical warhead design, fuze design, test, and production expertise. Major Thad Trapp of the Marine Corps Systems Command provided outstanding leadership and direction.

The SMAW-NE team is proud of its accomplishments in providing an urgently needed weapon system in record time, and in demonstrating its value and commitment to the warfighter.

IHDIV Innovations Enhance Safety of Sparrow Missiles

by Tara Landis
Corporate Communications Office

The RIM-7M Sea Sparrow is an active radar-guided, surface-to-air missile, with a high-explosive blast fragmentation warhead. U.S. Navy photo by Photographer's Mate 2nd Class, Allen L. Onstott.

Engineers and technicians in IHDIV's Non-Destructive Evaluation (NDE) Division have designed and proven successful an innovative ultrasonic inspection method for the Mk 58 Sparrow rocket motor that can be performed at laboratory, depot, or fleet locations around the world. The Manual Ultrasonic Testing (MUT) technique will increase the accuracy of anomaly detection, be easier to use, be more durable and safe, take less time, and lower costs.

The AIM-7 and RIM-7 Sparrow missiles are radar-guided, air-to-air and surface-to-air missiles, respectively. Introduced in the late 1970s with a Mk 58 rocket motor, these missiles are used by the Navy, Air Force, and foreign military sales (FMS) customers.

Since its introduction, over 10,000 Mk 58 rocket motors have been successfully fired and/or tested. In 1997, the first Mk 58 flight failure was reported with a second flight failure occurring in 1998. The joint Navy/Air Force flight failure investigation and continuing quality evaluation studies led to the Navy's decision to screen the active inventory. With earlier attempts to provide ultrasonic rocket motor testing capability unsuccessful, and with radiographic methods proving to be unfeasible for the number of units in the inventory, IHDIV was called on to develop a field inspection solution to this very critical issue.

IHDIV's MUT consists of off-the-shelf ultrasonic instrumentation combined with a specifically designed transducer. The transducer converts the electrical energy to ultrasonic energy, and ultrasonic back to electrical energy. The rocket motor is scanned in three separate locations, and data are then analyzed for abnormalities in real time, with each inspection taking approximately 15 minutes.

A Crane lifts an Evolved Sea Sparrow Missile (ESSM) aboard the guided missile destroyer USS McCampbell (DDG 85). U.S. Navy photo by Lt. j.g. Joel Jackson

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Fire Controlman prepare to load a NATO Sea Sparrow missile into a launcher aboard the nuclear powered aircraft carrier USS Theodore Roosevelt (CVN 71). U.S. Navy photo by Photographer's Mate 1st Class James Foehl.

The significant innovation of the method is its portability. The customer no longer has to remove the rocket motor from the missile, ship it to IHDIV, have IHDIV perform the inspection, and ship it back to the depot where it is reassembled and reloaded for transportation back to the ship/site. This program went through extensive safety approvals to allow the inspection to be performed directly to the missile without having to remove the rocket motor. Certified inspectors can now go to the warfighter instead of the warfighter having to ship his weapon to IHDIV. The logistical and financial advantages are significant compared to the previous NDE methods for tactical rocket motors.

The MUT system qualification testing (at IHDIV and Hill AFB), field trials and training (at Eglin AFB and Yorktown), and procedure manuals are complete. Energetics Evaluation Department personnel have been extremely busy with inspection requests. Numerous inspections have been performed in the U.S. and overseas including Yorktown, Guam, Singapore, Australia, Turkey, Germany, Greece, Egypt, Canada, and Hill and Tyndall Air Force bases. This list grows longer with the Navy installations of Fallon, Lemoore, and El Cajon and FMS customers of Kuwait, Jordan, Israel, and Portugal having requested support.

The IPT has made it a requirement that only ultrasonic engineers/technicians holding American Society of Nondestructive Testing (ASNT) Level III Ultrasonic certification can perform these inspections. It is also a requirement that a dual assessment by different personnel be done on each motor. Gordon Hendrickson, Manager of the NDE Division, emphasized the significance of IHDIV's good fortune in having onboard seven employees with ASNT Level III certification. "There is nowhere else in government or industry that has close to this many certified employees in one location," Hendrickson said. "This shows the dedication of the base and character of the employees working on this project."

A RIM-7 Sea Sparrow surface-to-air medium range missile launches during training exercise in the Atlantic aboard USS Harry S. Truman (CVN 75). This missile system is one type that will benefit from IHDIV's manual ultrasonic inspection capability. Official U.S. Navy photo.

Over 1,000 rocket motors have been inspected to date. When anomalies beyond the acceptance criteria are found, these rocket motors are set aside for additional engineering evaluation.

IHDIV's MUT has provided outstanding support to its Navy customers. "They have recognized the quality of work and know that we have great people working here," notes Hendrickson. The MUT recently received Weapon System Explosive Safety Review Board approval to begin onboard ship testing. Discussing the benefits the warfighter and the Navy will realize, Hendrickson said, "The warfighter will have increased safety, and the customers will know that when they fire the rocket motor, it will work properly.

A manual ultrasonic inspection is performed on a MK 58 rocket motor. Photo courtest of IHDIV.

The Navy has a proven, fast, responsive and flexible team at Indian Head. This will also strengthen our abilities to resolve any future problems."

Celebrating the Team That Kept the USAF Flying

by Craig Pfleegor
and Stefanie Jago
CAD/PAD Department

James Cooper of the Ordnance Department assembles CKU-5B/A ROCATS. Photo by Bill Spencer, IHDIV.

It was a celebration to thank the IHDIV Team for successfully producing a high quantity of a key ejection seat component in a short amount of time. Thanks to the IHDIV CKU-5 Production Team, the Air Force has continued to fly.

USN and USAF pilots must rely on their ejection seats to get them safely out of harm's way in the event of an aircraft failure. The CKU-5B/A rocket catapult is an essential part of ejection seats for nearly all USAF first-line combat aircraft (F-15, F-16, F-117, B-1, B-2, and A-10); without this CKU-5B/A component, an aircraft is grounded. The USAF plus foreign military sales aircraft contain over 3,500 ejection seats.

When a pilot pulls the ejection handle, a CAD (cartridge-actuated device) fires to initiate the ejection sequence during which the canopy is removed and the CKU-5B/A Rocket Catapult fires. Telescoping tubes extend to lift the seat out of the cockpit and then an integral rocket motor propels the seat and occupant to a height sufficient for safe parachute deployment and descent. The two phases of the CKU-5 are completed in about a second, producing up to 7,000 pounds of thrust. In addition, changes had to be made to the propellant formulation and processing so acceptable units could be produced.

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ACES II ejection seat used on USAF aircraft with the CKU-5 firing. Photo courtesy of IHDIV.

This change was necessary when IHDIV engineers detected that the properties of the commercially supplied polymer used in the propellant had undergone subtle changes since the propellant was qualified. These changes adversely affected the ability of the propellant to withstand temperature fluctuations that occur while the units are in service and still meet performance requirements. The problem was serious enough that the performance of an aged rocket motor was affected to the point where spinal injuries would occur should a pilot have to eject. Without the increased delivery of CKU-5B/As, aircraft would have been grounded because of the shortage of acceptable rocket catapults.

The necessary changes presented two problems: CKU-5s had to be removed from service early, and changes had to be made in propellant processing so acceptable units could be produced. Subsequently, available stocks of CKU-5s were quickly depleted.

Under the leadership of Glenn Campbell, Manager of the PAD Branch in the CAD/PAD Department, a team was formed to investigate process changes to produce acceptable CKU-5s using the same propellant. This investigation proved that the current propellant would not meet performance standards even with process changes, which prompted the team to look for alternative solutions. Tom Ilkka, a senior engineer in the PAD Branch, proposed using a propellant currently used in another rocket catapult. This idea proved successful and resulted in a suitable production substitute, which also provided improved ballistic performance.

The production effort was led by Stephen West, Amy Luebbering, David Mason, Thomas Briscoe, Zelda Brown, and Stefanie Jago. Aided by over fifty personnel from the Ordnance, Energetics Evaluation, and CAD/PAD Departments, IHDIV was able to meet production needs of the component.

Jago, CKU-5 Project Engineer, coordinated the production and test teams, making weekly reports to senior IHDIV management on production status. This team overcame several roadblocks along the way, but were able to produce and deliver the CKU-5s to the Air Force. Jago also developed and executed a test plan for in-service lots so they could be evaluated for either early removal or extended installation in aircraft without detriment to performance.

Employees of the CAD/PAD, Energetics Evaluation and Ordnance Departments celebrate their achievements at Indian Head. Courtesy of CAD/PAD Department. Photo by Bill Spencer, IHDIV.

This stepped-up effort meant IHDIV operations personnel had to work many hours of overtime, most of it on weekends and through the holidays, to meet this demand. The dedicated Indian Head workers persevered with over 1,350 units produced, tested, and accepted at triple the normal rate.

At a celebration to honor the hard work by the CKU-5 Production Team, CMSgt Karl Sagstetter, USAF Air Education and Training Command, expressed his appreciation, not only for the tremendous effort which kept USAF aircraft flying, but for the quality that goes into every CKU-5B/A. He emphasized how much the skill and expertise and dedication that goes into IHDIV's CKU-5B/A production makes a real life or death difference.

Artistic rendering of Conceptual Controllable Propulsion Ejection Seat.

Roger M. Smith Energetics Continuous Processing Facility - $6.5M Investment in Energetics Technology Celebrated with Naming and Dedication

by Tara Landis
Corporate Communications Office

With the new Roger M. Smith Energetics Continuous Processing Facility in the background the sign for the new building was unveiled by, l to r, Congressman Hoyer, Senator Sarbanes, Mrs. Mary Helen Smith (wife of the late Roger M. Smith), grandson Carson, and daughter Merrill Smith. Photo by Bill Spencer, IHDIV.

The Indian Head Division recently celebrated the completion of a $6.5 Million Energetics Continuous Processing Facility by naming it in honor of the activity's late technical director, Roger M. Smith. The ribbon cutting ceremony included Congressional officials, Smith's family members, employees, and other distinguished guests.

The audience was fully engaged as heartfelt remarks paid tribute to Smith, the visionary technical director who led the IHDIV from 1989 to 1999. Smith was collectively remembered as a witty, motivating force, who believed in creating a culture of teamwork.

The ceremony was an opportunity to revisit Smith's contributions and to celebrate his passion for driving new energetics technologies forward. Maryland Congressman Steny Hoyer recounted in his remarks that Smith coined the term "energetics," saying that Smith would explain his work to the layman as "things that go boom." "It is entirely appropriate that this facility be named for Roger Smith," said Hoyer.

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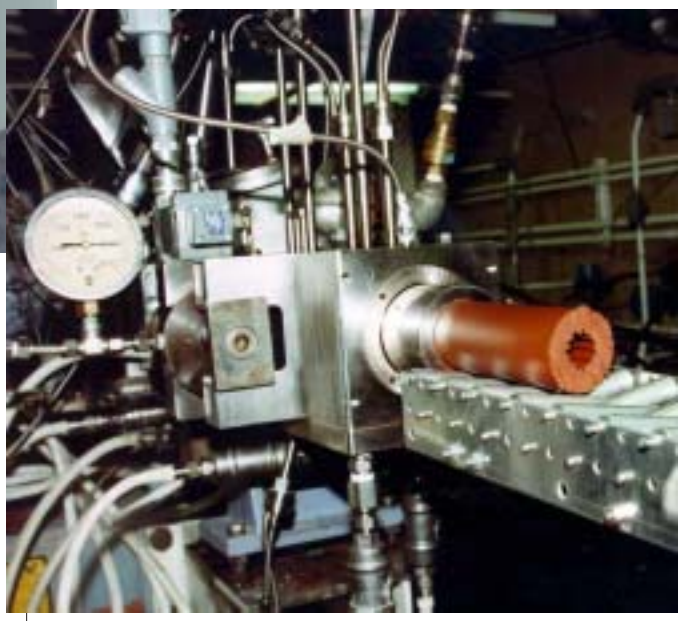
A composite grain for a 2.75-inch rocket motor made using twin-screw technology. Continuous processing is the only technology on the horizon that has the potential to improve product manufacturing while increasing safety, reducing waste generation, and lowering operational and maintenance costs. This new facility will allow IHDIV to meet the fleet's need for higher performance and lower cost energetic materials.



"His idea for a continuous processor was years ahead of its time, yet today it makes so much sense," he said, adding, "He did so much for the Navy, the United States, and for energetics. His intellect and creative thinking benefited the Navy and the entire military."

As a leader in the Navy Energetics Enterprise, IHDIV specializes in rapidly transitioning new energetics materials from initial concept, through research, development, and testing, to operational deployment by the warfighter. Before his untimely passing in 1999, Smith led the IHDIV workforce to pursue new energetics manufacturing technologies that were faster, safer, cheaper, and more environmentally friendly.

The new facility introduces an 88-mm twin-screw extruder to produce energetic materials. According to mechanical engineer Wayne Thomas, the twin-screw extruder is a unique, modular piece of equipment that can produce 500 pounds of energetic material in an hour under one roof, compared to current "batch processing" that uses multiple facilities to produce just 50 pounds of material per hour.

In an effort to increase worker safety while the extruder is in use, work is controlled a quarter mile away from a remote facility. The facility adapts technology from the food and plastics industries, putting familiar commercial equipment to innovative and militarily-beneficial use.

According to John Brough, Applied Technology Department Head, the new facility is still in a start-up phase. Processing of live material has yet to occur, but inert trials are going well with the expectation of the next phase, safety trials, to begin soon.

"Roger Smith was a key leader in terms of helping get this facility and moving the technology forward," said Brough. "He was a leader who championed new technology."

Eventually, the facility will incorporate a concrete walkway with embedded tracks leading to materials storage areas set apart from the facility. Robots will follow the tracks to move equipment and materials to increase production while cutting costs and reducing labor demands.

A technician checks equipment in the plants generator room. Photo by Bill Spencer, IHDIV.

Shows the 88mm twin screw extruder (TSE) in the open position. The screws are made of a brass alloy and are 88mm in diameter. Photo by Bill Spencer, IHDIV.

Pat Shifflette, Public Works engineer and IHDIV liason with the Washington Group International team that designed and built the facility, explained that the robots will enable the facility to work continuously for ten days at a stretch. "The new building keeps (product) quality more consistent and makes cleanup easier" than existing batch processing facilities, said Shifflette.

The dedication of the Roger M. Smith Continuous Processing Facility heralds exciting advances in technology for the Navy's Energetics Enterprise, the fleet, and the individuals who depend on energetics technology to fulfill their mission. The new facility combines several operations under one roof, bringing a substantial cost savings for the Navy.

The twin screw extruder is housed inside the blue framework and the remote takeaway systems in front of the extruder (foreground). The remote takeaway system is necessary to collect the strands of energetic material and cut them into the proper length. Because the extruder is a continuous process the machine can be stopped periodically to remove the strands. Photo by Bill Spencer, IHDIV.

The bins illustrated are used to hold the Iova powder. Each bin holds approximately 900 lbs of powder. The bins are automatically loaded as needed using a robot crane that is integrated into the control system. As one bin is emptied into the feeder the crane automatically removes it, returns it to one of the four positions shown here and replaces it with a full bin. Photo by Bill Spencer, IHDIV.

Overhead robot crane used to transport bins of LOVA material. Photo by Bill Spencer, IHDIV.